Membrane Disinfection Guide

Hydrogen Peroxide, Peracetic Acid Mixtures

The following are general recommendations for disinfecting TRISEP® reverse osmosis (RO) and nanofiltration (NF) elements. For additional instructions or questions, please contact MANN+HUMMEL Water & Fluid Solutions Technical Service.

INTRODUCTION

To maintain a sanitary system free of biological activity, a hydrogen peroxide solution, typically a mixture of hydrogen peroxide and peracetic acid, is a commonly used disinfectant in pharmaceutical and food & dairy systems.

Commercial hydrogen peroxide and peracetic acid solutions generally come in a concentrated form and are diluted with RO or NF permeate quality water (see Water Quality below for specifications) to obtain the appropriate concentration for disinfection. Please refer to the specific instructions of the chosen cleaning chemical supplier.

PRECAUTIONS

Hydrogen peroxide is an effective disinfectant, but is also an oxidizing agent. It is important to take caution to prevent degradation of the membrane.

Temperature

The disinfecting solution should not exceed 25°C (77°F). Elevated temperatures catalyze the reaction between the disinfectant and membrane surface, which may lead to membrane degradation.

Iron (and Other Transition Metals)

The presence of iron or other transition metals with hydrogen peroxide solutions can also catalyze the reaction between the disinfectant and membrane surface. Continuous exposure to the combination of iron (or other transition metals) and hydrogen peroxide solutions may eventually damage the membrane. It is important to use water as specified below to avoid membrane degradation.

GENERAL DISINFECTION PROCEDURE

For biologically contaminated systems, the following procedure using hydrogen peroxide solutions is recommended:

1. Before sanitizing, any deposits on the membrane or other parts of the system should be removed with an alkaline cleaner. Removing these deposits, microorganisms and bacteria, will maximize the effectiveness of the sanitization overall.
2. After the alkaline cleaning, flush the system with clean water. See *Water Quality* below.
3. Clean the system with acid to remove any iron from the membrane surface.
4. Flush the system with clean water.

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5. Circulate a solution of hydrogen peroxide/peracetic acid blend diluted with RO quality water at a temperature below 25°C (77°F). Please see cleaning chemical supplier's instructions for more detail.

WATER QUALITY

RO or NF quality water is recommended for diluting a peroxide solution and flushing a membrane system, but prefiltered water may be used. Table 1 outlines the quality of water suitable for diluting solutions and flushing systems.

TABLE 1. CIP WATER QUALITY RECOMMENDATIONS.

Solute	Recommended Limit
Iron (Fe)	< 0.05 mg/L
Manganese (Mn)	< 0.02 mg/L
Aluminum (Al)	< 0.05 mg/L
Silica (SiO_2)	< 5.0 mg/L
Total Hardness as $CaCO_3$	< 50 mg/L as $CaCO_3$
Total Alkalinity as $CaCO_3$	< 50 mg/L as $CaCO_3$
Chlorine	0 mg/L
Turbidity	< 0.5 NTU
Silt	< 1 SDI

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